



"PATENT"

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: § EXAMINER: Walter D. Griffin  
Bruce R. Cook, et al. §  
§ GROUP ART UNIT: 1764  
S SERIAL §  
NUMBER: 09/676,875 §  
§ FILED: September 29, 2000 § ATTY. DOCKET NO.: ECB-0004  
FOR: CATALYTIC STRIPPING FOR §  
MERCAPTAN REMOVAL §  
§

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

1. I, Robert C. Welch, do declare and say as follows:
2. That I am a co-inventor of the invention set forth in the above-noted patent application;
3. That I am presently employed by ExxonMobil Refining and Supply Company and have also been employed by Exxon Research and Engineering Company;
4. That I am a Senior Engineering Associate and have been working in the field of petroleum fuels processes, providing research guidance and engineering;
5. That my academic training is as set forth below:

The University of Texas at Austin - BS ChE 1963  
The University of Texas at Austin - PhD ChE 1968;
6. That I am familiar with the disclosure of the subject matter in the subject patent application;

7. That I have read the disclosures of U.S. Patents 5,554,275 (Harandi) and 5,906,730 (Hatanaka);

8. That I have read the Examiner's Statement that applicants have not shown that the supported metals of the prior art catalysts affect the characteristics of the material in relation to the claimed process;

9. That I am familiar with and participated in obtaining the data presented in Example 1 of the subject application;

10. That the commercial cobalt promoted molybdenum sulfide hydrotreating catalyst of Example 1 is a Criterion catalyst designated as C-447;

11. That C-447 comprises 15.3 wt.% MoO<sub>3</sub> and 4.3 wt.% CoO on a gamma alumina support;

12. That the data in columns 1 and 3 of the Table on page 12 of the disclosure is a comparison of  $\gamma$ -alumina and a  $\gamma$ -alumina support loaded with Co and Mo as active metals in the presence of hydrogen as stripping gas;

13. That the data in columns 2 and 4 of the Table on page 12 is a comparison of  $\gamma$ -alumina and a  $\gamma$ -alumina support loaded with Co and Mo as active metals in the presence of nitrogen as stripping gas;

14. That a comparison of the data in the Table between  $\gamma$ -alumina in the presence of hydrogen vs.  $\gamma$ -alumina loaded with Co/Mo (CoMoS) demonstrates that while the latter catalyst (CoMoS) is better at reducing the level of sulfur, the CoMoS catalyst results in a substantial and undesirable loss of octane (Bromine No. 18.5 vs. 12.8);

15. That a comparison of the data in the Table between  $\gamma$ -alumina vs.  $\gamma$ -alumina loaded with Co/Mo (CoMoS) in the presence of nitrogen demonstrates that the former rapidly deactivates with almost no sulfur conversion, whereas the latter results in an observed conversion rate of about 95% for mercaptan sulfur, resulting in a total measured sulfur of 53 wppm for  $\gamma$ -alumina vs. 20 for CoMoS, while neither catalyst resulted in significant olefin saturation (Bromine No. 18.8 vs. 18.7);

16. That the catalyst in Example 1 of the Hatanaka reference is a commercially available catalyst comprising an alumina carrier having supported thereon 4.0 wt.% of CoO and 15 wt.% MoO<sub>3</sub>;

17. That a preferred HDS catalyst of Harandi is Co/Mo on alumina as taught in column 1, lines 49-50;

18. That applicants have shown that the claimed process under the conditions of amended claim 1 do provide unexpected results over the above-cited catalysts of Hatanaka and Harandi.

Further, affiant sayeth not.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Signed: Robert C. Welch  
Robert C. Welch

Dated: October 24, 2003